

# Enhanced Early Detection of Occupational Stress among Department of Energy Nuclear Waste Workers

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# OCCUPATIONAL STRESS

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## BACKGROUND

- “Occupational stress also known as work-related stress has been well studied and determined to be the source of causation of several work-related illnesses, including musculoskeletal disease (MSD), back pain, and cardiovascular disease (CVD), depression, and burnout” — *Sophie Bénjean, et al. (2004).*
- The cost of work-related stress illnesses is enormous. It cost industry a lot of money in worker compensation (millions of dollar). Workers and employers are both affected by the cost and causation of work-related stress in the workplace. It induces harmful behaviors such as excessive drinking, drug abuse and other risk behaviors embedded in this problem □□ *Sophie Bénjean, et al. (2004)*
- Continue improvement in safety and health program coupled with the good early detection program based on medical screening and preventive medicine can improve this problem among the US working population.



# Abstract

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Occupational stress has not been previously evaluated as it relates to the Department of Energy's nuclear waste clean-up operations. Correlations between the stressful working environment and the increased incidence of cardiovascular diseases, stroke, hypertension, and coronary disease are based upon comparisons to other work environments. This research study elucidates the relationships between the high-risk radioactive waste operations and processes that contribute to increases in occupational stress among the aging working population throughout the DOE complex. The review of literature indicates that there is limited information on occupational stress as applied to nuclear waste clean-up sites in the United States in light of the radiological hazards and chemical conditions confronting workers during their day-to-day waste clean-up operations. The results of the study are expected to provide protocols and methods to reduce stressful working conditions in DOE complex and to enhance early interventions of health effects, thereby reducing the dollar cost of worker absenteeism among the waste clean-up working population throughout the DOE complex



# Occupational Stress

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- This is a major hazard for many workers.
  - Cardiovascular Disease
  - Hypertension
  - Stroke
- The industry median absence from work for these cases was 23 days, more than four times the level of nonfatal occupational injuries and illness.
- Loss of productivity
- Increased rates of tension, anger, anxiety, depression, and sleep loss



# Research Process Design

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- Method: Survey Questionnaire
  - Self-Assessed
  - One Page Questionnaire
  - Ten Questions
- Statistical Analysis and Interpretation of Field Data Results
- Expected Duration: 2-3 years
- Locations: Hanford Site, Oak Ridge, and Savannah River Site



# Sample Survey

No	Question	Yes	No	Comments
1.	How often, in the last year, has there been a great deal to do on your job?			
2.	How often is there a marked increase in your work load?			
3.	How often is there a marked increase in the amount of concentration required on your job?			
4.	Do you leave your office to eat lunch?			
5.	Do you have ever have difficulty sleeping because you are thinking about work-related concerns?			
6.	Do work concerns weigh on your mind at home?			



# Literature Review

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- **Shigemi, J., Mino, Y., Ohtsu T., & Tsuda T. (2000).** Effects of perceived jobs stress on mental health. A longitudinal survey in a Japanese electronic company. *European Journal of Epidemiology*, 16(40, 371-376:

Shigemi and co-workers did a cohort study among the 782 workers in a local mid-sized electronic company in Okayama City, Japan, using Cox's proportional hazard control model to elucidate the relationship between perceived job stress and mental health. The study found that after 6 months, there were 69 cases of unhealthy mental state, 36 after one year, and 19 after two years with indication that some stressors affected certain gender than the other (female workers between age of 40s and >50s were more affected), coupled with other factors such as "Too much trouble at work", "Too much responsibility". Poor relationship with superiors" particular had a significant hazardous effect on mental health on workers at the Okayama City plant.



# Literature Review

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- **Jeanne-Marie R. Stacciarini, et al (2004).** Occupational Stress and Constructive Thinking: health and job satisfaction. *Journal of Advanced Nursing* 46(5), 480-487).

In Brazil , Stacciarini and fellow worker studied impact of stress among the 461 nurses from the public health and education system in Brazil, using ANOVA- Turkey contrast and correlation tests - SPSS software to analyze and describe the relationship between occupational stress, job satisfaction and state of health of the 461 public health education system workers. Stacciarini and co-worker indicated occupational stress was inversely related with job satisfaction and indirectly related with psychological ill-health; constructive thinking is associated with jobs satisfaction more with director of nurses than the regular nurses.





# Literature Review

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- **Sophie Béjean, Hélène Sultan-Taïeb. (2004).** Modeling the economic burden of diseases imputable to stress at work. *European Journal of Health Economics*, 2005.50:5016-23, and also published online:28 September 2004.

In Béjean, et al. (2004) investigation of the economic burden of diseases imputable to stress related-work activities among 23.53 million French working population in France. 310, 000–393,400 persons or 13-1.7% of the working population were affected by illnesses attributed to work related stress, and 2,300-3,600 persons died (out of 300,000 cases in the total working population). The causes of death were due to illnesses and work related stressors such as depression, Musculoskeletal disease (MSD), back pain and Cardiovascular diseases (CVD). Béjean and co-investigator indicated that occupational stress cost French society between €1, 167 million and €1, 975, or 14.4-24.2% of the total French spending of social security occupational illnesses and work injury branch in 2000.



# Other Literature Review

- Bartlett C.J., & Coles E.C. (1998). Psychological health and well-being: why and how should public health specialists measure it? Part 1: rationale and methods of the investigation, and review of psychiatric epidemiology. *Journal of Public Health Medicine*, 20(3), 281-287.
- Bartlett C.J., & Coles E.C. (1998). Psychological health and well-being: why and how should public health specialists measure it? Part 2: stress, subjective well-being and overall conclusions. *Journal of Public Health Medicine*, 20(3), 288-294.
- Epel, E.S., Blackburn, E.H., Lin, J., Dhabhar, F.S., Adler, N.E., Morrow, J.D. & Cawthon, R.M. (2004). Accelerated telomere shortening in response to life stress. *Proceedings of the National Academy of Sciences of the United States of America*, 101(49), 17312-17315.
- Gochfeld, M., & Mohr, S. (2007). Protecting contract workers: case study of the US Department of Energy's nuclear and chemical waste management. *American Journal of Public Health*, 97(9), 1607-1613.
- LaRocco, J.M., House, J.S., & French, J.R.P. (1980). Social support, occupational stress, and health. *Journal of Health and Social Behavior*, 21(3), 202-218.
- Manning, M.R., Jackson, C.N., & Fusilier, M.R. (1996). Occupational stress, social support, and the costs of health care. *The Academy of Management Journals*, 39 (3), 738-750.
- Nordstrom, C.K., Dwyer, K.M., Bairey Merz, C.N., Shircore, A., & Dwyer, J.H. (2001). Work-related stress and early atherosclerosis. *Epidemiology*, 12(2), 180-185.
- Shigemi, J., Mino, Y., Ohtsu T., & Tsuda T. (2000). Effects of perceived jobs stress on mental health. A longitudinal survey in a Japanese electronic company. *European Journal of Epidemiology*, 16(4), 371-376.
- Stacciarini, J.-M.R., & Troccoli, B.T. (2004). Occupational stress and constructive thinking: health and job satisfaction. *Journal of Advanced Nursing*, 46(5), 480-487.
- Van der Klink, J.J.L, Blonk, R.W.B., Schene, A.H., & Van Dijk, F.J.H (2001). The benefits of interventions for work-related stress. *American Journal of Public Health*, 91(2), 270-276.



# Impact and Causation

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- Impact of occupational stress or work-related stress among the DOE Hazardous Waste worker has not been studied or evaluated to know how this impact the well-being of the DOE working population and cost.



# Conclusion

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- This is 2-3 years worker protection study for our summer intern and DOE-SR co-workers servings as mentors.
- Intent of research study is to improve worker safety and health program across the DOE complex and enhance early detection of occupational stress among the DOE nuclear waste workers.



# Investigators

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## **Charles Olaiya, Sc.D**, DOE Savannah River Site-Aiken, S.C

Dr. Charles Olaiya is both Environmental Health Scientist and Industrial Hygienist with more than 16 years of field and management experience in the areas of health risk assessment, industrial hygiene exposure risk assessment, occupational health and medical monitoring at the U.S. Department of Energy (DOE) Hanford Nuclear Waste Site in Richland, Washington, and currently at DOE Savannah River Site Aiken, South Carolina. Charles earned a doctor of science (ScD) degree in environmental health sciences from Tulane School of Public Health and Tropical Medicine in New-Orleans, Louisiana, master's of science degree in industrial hygiene (MS) from Central Missouri State University, Warrensburg, Missouri, and bachelor's degree in business administration (BA) from the University of Texas in San-Antonio, Texas. He is a recipient of the DOE "Advanced Education Scholar Award."

## **Sherri Robinson**, DOE Savannah River Site Aiken,

## **Jeffery Tran**, University of Georgia-Athens, GA

Jeffrey Tran is a second year honor roll student at the University of Georgia, where he is a majoring in Biology and Psychology and is a part of the Honors Program. He is also active in the extracurricular activities, serving as a team captain and a fundraising committee member for a Relay for Life and is also the Public Relations officer for the Vietnamese Student Association at the university. He previously was a Ace-Level member of the First Tee program, participating in the 2007 Walmart First Tee Open. His involvement of the Department of Energy began this past May, where he interned with the Office of Safety and Quality Assurance.

